DRAFT

BIOLOGICAL RESOURCES AND MITIGATION OPPORTUNITIES AND CONSTRAINTS FOR CITY OF TUCSON PROPERTIES IN THE AVRA VALLEY

Submitted to

CITY OF TUCSON
Comprehensive Planning Task Force

Submitted by

SWCA® Environmental Consultants

SEPTEMBER 2003

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Comprehensive Planning Task Force
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EXECUTIVE SUMMARY

The City of Tucson owns almost 24,000 acres of land in the Avra Valley, unincorporated Pima County, Arizona. This report summarizes observations and available information on the Avra Valley lands with regard to animal and plant species that are considered special interest species. It was prepared at the request of the City of Tucson to support decisions that might be made in planning for the management of these Avra Valley properties. To this end, the report includes the following: (1) a biological evaluation of the potential for species listed as threatened or endangered under the federal Endangered Species Act and other special interest species to occur on City-owned properties in the Avra Valley; (2) a review of potential opportunities and constraints for mitigation and habitat enhancement for the species that potentially may occur on these properties; and (3) a foundation for the future preparation of a Habitat Conservation Plan (HCP) for these species.

The Avra Valley lands considered in this report encompass 26 parcels, totaling approximately 23,920 acres. Elevations of the Avra Valley lands range from approximately 2,650 ft at the southernmost parcel, to 1,890 ft at the northernmost parcel. There are few bedrock outcrops in the Avra Valley, and none on City of Tucson properties. The landform characteristic of the Avra Valley parcels is deep valley fill, with materials derived from the Tucson Mountains on the east and the Waterman and Roskruge Mountains on the west. Soils are deep alluvial, and consist of varying proportions of sand, loam, and gravel. No natural permanent or semi-permanent water is present on any of the parcels. Many of the parcels are within the 100-year floodplain of Brawley Wash, and show signs of having been covered by floodwaters in recent decades. Most of the parcels have been disturbed by agricultural activities, including irrigated farming that occurred before purchase by the City.

Landowners and managers neighboring the Avra Valley parcels include the Arizona State Land Department (ASLD), Bureau of Land Management, Tohono O'odham Nation, and private landowners. Adjacent land uses include agricultural production (cotton, wheat, alfalfa), low-density residential, and open space.

Vegetation communities on City-owned Avra Valley lands include upland and riparian communities, both of which have been extensively modified by human activities. Upland vegetation communities on City-owned properties in the Avra Valley include Scrub Grassland, Sonoran Desertscrub, and Sonoran Vacant or Fallow Land. Riparian vegetation communities include Sonoran Desertscrub Xeroriparian, Sonoran Riparian Deciduous Forest and Woodland (both mesquite and cottonwood-willow series), and Sonoran Deciduous Riparian Scrub.

A total of 74 special-interest species were evaluated for potential occurrence on the City-owned lands. A special interest species is defined herein as any species of interest to any regulatory or management agency of the Federal, State or local government. Species considered here include:

- Species that may be found in Pima County that are currently listed, proposed, or candidates for listing by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA);

- Species considered as Wildlife Species of Special Concern In Arizona (WSCA) by the Arizona Game and Fish Department that are known to occur in the Avra Valley area; and

- Species included as Priority Vulnerable Species in Pima County's SDCP.

Of these 74 species, 22 were considered as having the potential to occur on City-owned parcels. Federally listed threatened, endangered, proposed, or candidate species that might occur on one or more of the parcels are: Pima pineapple cactus, cactus ferruginous pygmy-owl, yellow-billed cuckoo, and lesser long-nosed bat.

Possible City liability for take under the Endangered Species Act and suggestions for avoidance of take are considered. Liability is limited because likelihood of occurrence for the above-mentioned species is limited. Take of cactus ferruginous pygmy-owl and Pima Pineapple cactus can be minimized or avoided by conducting presence/absence surveys on those parcels that have habitat conditions considered potentially suitable for these species. Chances of encountering either species on any of the City-owned parcels are minimal. Take of yellow-billed cuckoo could potentially occur on parcels along the Santa Cruz River, but the presence of cuckoo as a nesting species is not likely unless habitat conditions improve over those currently found. Take of lesser long-nosed bat is highly unlikely because none of the parcels provide roosts or habitat conditions considered suitable for this species.

The situation with regard to the listing of the cactus ferruginous pygmy-owl (CFPO) and the designation of critical habitat is dynamic. In August 2003, the Ninth Circuit Court of Appeals determined that the USFWS "did not articulate a rational basis... for its finding that the discrete Arizona pygmy-owl populations is significant..." and the listing was remanded to the District Court where it will be either upheld or rescinded. For now, however, the owl remains listed as an endangered species under the protection of the ESA. Critical habitat for the CFPO was proposed in November 2002, and the proposed critical habitat includes some City-owned lands. In the most recent Draft Recovery Plan (January 2003), several City-owned parcels are within the boundaries of a proposed CFPO recovery area. Of these, two parcels are currently developed or proposed as CAVSARP and SAVSARP project areas. Of particular concern is that these parcels appear to have been identified as a critically important connecting corridor for owls in the Recovery Plan. It is, therefore, possible that the final designated critical habitat boundaries will include these sites. If the listing of the species as endangered is upheld, and it the final designated critical habitat includes City-owned lands, then mitigation may be required in further development of some City projects in the Avra Valley.

Potential mitigation opportunities for Pima Pineapple cactus are limited because there is very little if any potentially suitable habitat in the study area. Potential mitigation opportunities for cactus ferruginous pygmy-owl depend to a large degree on whether critical habitat includes any of the City-owned lands. Other potential mitigation opportunities may exist for species that are not listed under the Endangered

Species Act, but are currently considered Potentially Vulnerable Species in the Sonoran Desert Conservation Plan being developed by Pima County. Possibilities include fishes, frogs, and birds.

1.0 INTRODUCTION

The City of Tucson owns almost 24,000 acres of land in the Avra Valley, unincorporated Pima County, Arizona. This report summarizes observations and available information on the Avra Valley lands with regard to animal and plant species that are considered special interest species. It was prepared at the request of the City of Tucson to support decisions that might be made in planning for the management of these Avra Valley properties. To this end, the report includes the following: (1) a biological evaluation of the potential for species listed as threatened or endangered under the federal Endangered Species Act and other special interest species to occur on City-owned properties in the Avra Valley; (2) a review of potential opportunities and constraints for mitigation and habitat enhancement for the species that potentially may occur on these properties; and (3) a foundation for the future preparation of a Habitat Conservation Plan (HCP) for these species.

Acreage numbers given in the text and appendix are approximate and rounded to whole numbers, based on the delineation of vegetation types on aerial photographs and calculations made using ArcView.

Sources of information considered in this report include:

- The website prepared for Pima County as part of the Sonoran Desert Conservation Plan (SDCP) (http://www.dot.co.pima.az.us/cmo/sdcpmaps/);
- Reports compiled as part of the SDCP;
- Data compiled by the Arizona Heritage Data Management System;
- Data compiled for the Arizona Breeding Bird Atlas;
- *Avra Valley Land Use Study for City of Tucson Property Holdings* (March 1996), prepared by the City of Tucson;
- Map of Tucson Well Water Rights and Historic Irrigated Acreage Within City of Tucson Farm Holdings in Avra Valley; and
- Personal experience of the authors, Kenneth J. Kingsley and Kenneth J. Kertell, who have visited all of the Avra Valley properties addressed in this study.

2.0 PROJECT AREA

2.1 LOCATION

The Avra Valley lands considered in this report encompass 26 parcels, totaling approximately 23,920 acres. Figure 1 shows the locations of the 26 parcels; brief descriptions of each parcel are included in Appendix A. The City of Tucson purchased these lands over a period of more than 20 years. The primary management goals for the Avra Valley lands has been to secure the water rights associated with the lands and preserve groundwater for urban use.

Landowners and managers neighboring the Avra Valley parcels include the Arizona State Land Department (ASLD), Bureau of Land Management, Tohono O'odham Nation, and private landowners. Adjacent land uses include agricultural production (cotton, wheat, alfalfa), low-density residential, and open space. Figure 1 identifies the ownership/management status of neighboring lands.

2.2 GEOLOGY, LANDFORMS, AND FLOODING

Figure 2 is a natural color satellite image of the Avra Valley, showing City-owned parcels, major landforms, and the designated 100-year floodplain. Elevations of the Avra Valley lands range from approximately 2,650 ft (807 m) at the southernmost parcel, to 1,890 ft (576 m) at the northernmost parcel. There are few bedrock outcrops in the Avra Valley, and none on City of Tucson properties. The landform characteristic of the Avra Valley parcels is deep valley fill, with materials derived from the Tucson Mountains on the east and the Waterman and Roskruge Mountains on the west. Soils are deep alluvial, and consist of varying proportions of sand, loam, and gravel.

The major drainage through the Avra Valley is Brawley Wash, which is a complexly braided system with many small tributaries. Brawley Wash is the downstream continuation of Avra Wash, and is a major tributary of the Santa Cruz River. The Avra Valley is generally flat. Floodwater drainage throughout most of the Avra Valley is by sheet flow, which collects in a few tributaries of Brawley Wash, or impounds behind man-made structures, such as roads and berms. Much of the City-owned property is within the Federal Emergency Management Agency Designated 100-year floodplain. Major flood events occurred in this area in 1983 and 1993, with water remaining for several months on some City-owned properties. Evidence of flooding in the Avra Valley includes dead trees, bare ground, and deep silt deposits. Following the 1993 floods, some impediments to surface flow (i.e. berms) were removed and some drainage ditches were dug. These actions may reduce future flood impacts to some of the City-owned lands.

2.3 WATER

There is no naturally occurring surface water on any of the City of Tucson properties, and no known naturally occurring surface water anywhere in the Avra Valley. The Santa Cruz River is an effluent-

Figure 1. Locations of City of Tucson Avra Valley Lands and neighboring land ownership.

Figure 2. Satellite image of Avra Valley, indicating City-owned parcels and designated floodplain.

dominated stream that crosses the northern boundary of the Avra Valley, intersecting three of the City properties discussed in this report (parcels 1, 2A, and 5).

2.4 VEGETATION

Vegetation communities on City-owned Avra Valley lands include upland and riparian communities, both of which have been extensively modified by human activities. The system of vegetation classification currently used in the SDCP[1] is followed here. Distribution of vegetation communities in the Avra Valley is depicted in Figure 3. Several different vegetation maps of the Avra Valley have been produced over the past several years; the most recent available maps are used for this report (Pima County SDCP Website, Vegetation Composite and Harris Riparian maps).[2]

2.4.1 Upland Vegetation

Upland vegetation communities on City-owned properties in the Avra Valley include:

Scrub Grassland, also called Semidesert Grassland (BLP Code 143.1). This community is present at the south end of the Avra Valley at an elevation range of approximately 2,650 ft to 2,300 ft. It is present on City of Tucson parcels 23, 24, and 25. The dominant tree in this community is the velvet mesquite (*Prosopis velutina*), and the dominant shrub is creosote bush (*Larrea tridentata*). Additional shrub species include burroweed (*Isocoma tenuisecta*) and snakeweed (*Guttierezia* spp.). Some native perennial and annual grass species occur, as well as the introduced Lehmann lovegrass (*Eragrostis lehmanniana*), which is the most abundant grass species in the Avra Valley area. This community is also known as Southern Arizona Semidesert Grassland, Sonoran Palo Verde-Mixed Cacti/Semidesert Grassland, Semidesert Mixed Grass-Mixed Scrub, and Semidesert Mixed Grass-Mesquite under other classification systems. Vegetation series and associations that occur within this community include:

Mixed grass-scrub series (143.15)

Mixed grass-mesquite association (143.152) occupies part of the area south of Arizona Highway 86, including a small portion of Parcel 25. This includes grass and some shrubs, the most prevalent of which is mesquite growing as a shrub in an upland situation.

Mixed grass-mixed scrub association (143.155) occupies a small portion of the valley north of Arizona Highway 86, including part of parcels 23 and 24. This association includes a mixture of grass and shrub species, with no species being particularly dominant.

Sonoran Desertscrub (BLP Code 154.1). This is the major desert vegetation community of Pima County, and the most prevalent vegetation community within the Avra Valley. It occurs on all City-owned parcels

[1] Brown, D.E. (ed.) 1994. Biotic communities: southwestern United States and northwestern Mexico. University of Utah Press. Salt Lake City.
[2] http://www.dot.co.pima.az.us/gis/maps/mapguide/mgmap.cfm?path=/cmo/sdcpmaps/sdcp.mwf

or portions of City-owned parcels that have not been used previously for agricultural production. Sonoran Desertscrub is divided into two series (depending upon the dominant vegetation), the presence of which is dependent to a large degree on slope, soils, and exposure. Vegetation series that occur within this community include:

> Creosote-bursage series (154.11) is dominated by creosote bush and triangle burr ragweed (*Ambrosia deltoidea*). This series is prevalent on lower elevation lands that are flat and generally have very deep, fine alluvial soil. Most of the undisturbed upland vegetation on City-owned parcels in the Avra Valley is this series.
>
> Paloverde-mixed cacti series (BLP Code 154.12) occurs on the higher elevation slopes at the edges of the Avra Valley and on rocky soils. This association generally is dominated by yellow paloverde (*Parkinsonia microphylla*) and triangle burr ragweed. Saguaros (*Carnegiea gigantea*) and other cacti may also be present, although there are few present on the City-owned lands. This series has not been identified as being present on City-owned parcels in the Avra Valley.

Sonoran Vacant or Fallow Land (BLP Code 364.1). This is the dominant vegetation community on City-owned lands. This community consists of agricultural lands that are fallow or in the early stages of abandonment, and vacant lots within the urban setting. Plants commonly established here include velvet mesquite, burroweed, desert globe mallow (*Sphaeralcea ambigua*), prickly Russian thistle (*Salsola tragus*), silverleaf nightshade (*Solanum elaeagnifolium*), western tansymustard (*Descurainia pinnata*), shaggyfruit pepperweed (*Lepidium lasiocarpum*), and several species of grasses, mostly non-native. On some of the City-owned lands, non-native grasses were planted in the 1980's. Mowing of vegetation occurs periodically on many of the City-owned parcels. The goal of this management technique is to prevent weed growth, but it also has the consequence of preventing succession to a shrub or tree-dominated plant community. This vegetation type is not mapped in Figure 3, but is included in vegetation acreage calculations and descriptions of each parcel in Appendix A.

2.4.2 Riparian Vegetation

Riparian vegetation communities on City-owned properties in the Avra Valley include:

Sonoran Desertscrub Xeroriparian (BLP Code 154.10). Vegetation found along the normally dry washes within the Sonoran Desertscrub community is classified as xeroriparian. This is a shrub-dominated riparian community. Velvet mesquite, which can occur as a shrub or small tree is the most abundant species. Ironwood (*Olneya tesota*) may also be present. Other shrubs include desert broom (*Baccharis sarothroides*), catclaw acacia (*Acacia greggii*), and burrobrush (*Hymenoclea monogyra*). This type of riparian vegetation is present on most of the City-owned properties in the Avra Valley.

Sonoran Riparian Deciduous Forest and Woodland (BLP Code 224.50). This is a deciduous riparian community dominated either by velvet mesquite (as trees) or Fremont cottonwood (*Populus fremontii*)

Figure 3. Vegetation communities in the Avra Valley (source: Pima County SDCP website).

and/or Goodding's willow (*Salix gooddingii*). Usually perennial or near-perennial streams or springs are necessary to provide water for the trees, although this is not always the case for the mesquite series. This community is divided into the following two series, based on the dominant tree species:

> Mesquite series (224.52). This series is characterized by structurally diverse stands of velvet mesquite that range from open to dense. Portions of the series contain a high density of mesquite mistletoe (*Phoradendron californicum*), a native parasite that may indicate stress to the trees. Other species commonly present in this series are catclaw acacia and blue palo verde (*Parkinsonia florida*). Midstory species include pitseed goosefoot (*Chenopodium berlanderi*), lotebush (*Zizyphus obtusifolia*), and four-wing saltbush (*Atriplex canescens*). Prickly Russian thistle, camphorweed (*Heterotheca subaxillaris*), and several species of grasses, vines and forbs are present in the understory. This series is present on parcels 2B, 5, 11, 17, 18, 24, and 26.
>
> Cottonwood-willow series (224.53). This series is dominated by Fremont cottonwood and Goodding's willow. Trees may be more than 50 ft tall and very dense. Other species commonly found in this community include velvet ash (*Fraxinus pennsylvannica* var. *velutina*), netleaf hackberry (*Celtis reticulata*), velvet mesquite, and salt cedar (*Tamarisk ramosissima*). This series is present on parcel 1.

Sonoran Deciduous Riparian Scrub (BLP Code 234.7). This is a shrub-dominated riparian community. The most abundant species is velvet mesquite, which can occur as a large, dense shrub or small tree. Other shrubs include desert broom, catclaw acacia, and burrobrush. This community is subject to frequent flooding, which prevents it from maturing to a tree-dominated community. This series is present on parcels 1 and 5.

2.5 SPECIAL INTEREST SPECIES

A special interest species is defined herein as any species of interest to any regulatory or management agency of the Federal, State or local government. Table 1 lists the special interest species considered in this report. Included are:

- Species that may be found in Pima County that are currently listed, proposed, or candidates for listing by the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA);
- Species considered as Wildlife Species of Special Concern In Arizona (WSCA) by the Arizona Game and Fish Department that are known to occur in the Avra Valley area; and
- Species included as Priority Vulnerable Species in Pima County's SDCP.

Table 1 lists all special interest species considered, characteristics of habitats in which they may occur, and an evaluation of the likelihood of each species occurring on City-owned properties in the Avra Valley under current conditions.

Species that are known to occur or are considered likely to occur on the Avra Valley lands may provide mitigation opportunities for the City of Tucson. Also, some species that are not currently known to occur on the Avra Valley lands may be appropriate candidates for introduction (or re-introduction, if they may once have occurred there).

Table 1. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
PLANTS			
Huachuca water umbel (*Lilaeopsis schaffneriana* ssp. *recurva*)	USFWS E USFS-S ADAHS PVS	A semi-aquatic plant (requiring permanent water) formerly found in cienegas and streams in the Santa Cruz and San Pedro River valleys. Critical habitat has been designated for this species, but none is in Pima County.	Highly unlikely to occur under present conditions. This species is no longer known from the Santa Cruz River, from which it was extirpated. Possibly could be re-introduced on parcels 1, 2A, and 5, or in created wetlands.
Kearney's blue star (*Amsonia kearneyana*)	USFWS E USFS-S ADAHS	Known only from a few locations in the Baboquivari Mountains at 3,600-3,800 ft with Arizona walnut, Mexican blue oak, and velvet mesquite.	Extremely unlikely to occur. The Avra Valley lands are approximately 1,000 ft below the normal elevation range for this species.
Nichol's Turk's head cactus (*Echinocactus horizonthalonius* var. *nicholii*)	USFWS E ADAHS PVS	Known only from a very small area between 2,400-4,100 ft on dissected alluvial fans at the foot of limestone mountains or on limestone mountainsides.	Extremely unlikely to occur. The Avra Valley lands do not contain the limestone rock substrates required by this species.
Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*)	USFWS E USFS-S ADAHS PVS	Found south of Tucson, between the Santa Rita and Baboquivari Mountains, where it occurs at elevations between 2,300 and 4,500 ft. Most of the known locations are in the Altar and Avra Valleys, Santa Cruz River Basin, and the alluvial fans of the Sierrita, Santa Rita, Empire, Coyote, and Pajarito Mountains.	Possibly may occur on parcels 24, 25, and 26. The Avra Valley lands are mostly north of the known geographic range of the species.
Acuña cactus (*Echinomastus erectrocentrus* var. *acunensis*)	USFWS C USFS-S ADAHS PVS	Found in Arizona Upland Subdivision of the Sonoran Desertscrub on well-drained knolls and gravel ridges at elevations between 1,300 and 2,000 ft. In 1992, known to occur in only two Arizona locations, near Organ Pipe Cactus National Monument and near Florence.	Extremely unlikely to occur. The Avra Valley lands are more than 60 miles from the nearest known locations of the species.
Gooddings onion (*Allium gooddingii*)	USFWS CA USFS-S ADAHS	This species occurs in forested drainage bottoms and on moist north facing slopes of mixed conifer and spruce forest at elevations above 7,500 ft.	Extremely unlikely to occur. The Avra Valley lands are 5,000 ft below the elevation range of this species. Vegetation communities and substrates in the Avra Valley lands are not similar to those from which this species is known.
Gentry indigobush *(Dalea tentaculoides)*	USFWS SOC USFS-S ADAHS PVS	Not currently known from Pima County, but unknown populations may occur in rocky canyon bottoms that are not grazed. Known only in Sycamore Canyon drainage in the Atascosa Mountains, Pajarito Mountains, Santa Cruz County, and Baboquivari Mountains.	Extremely unlikely to occur. The Avra Valley lands are more than 25 miles from the known range of the species, and do not include rocky canyon bottoms that are not grazed.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
PLANTS			
needle-spined pineapple cactus *(Echinomastus erectocentrus erectocentrus)*	USFWS SOC USFS-S ADASR PVS	Pima County encompasses much of the known range of this cactus variety. Occurs in Sonoran Desertscrub and Semidesert Grassland vegetation communities where it is found on alluvial fans and hills generally from 3,000 to 4,600 ft, in the foothills of the Santa Catalina, Rincon and Santa Rita Mountains.	Extremely unlikely to occur. The Avra Valley lands are below the known elevation range of this species, and the nearest known population is more than 30 miles east of the Avra Valley.
Tumamoc globeberry *(Tumamoca macdougalii*)	Removed from Endangered Species List in 1993 USFS-S ADASR PVS	The range of this plant covers some 31,000 square miles of Sonoran Desert from Sonora, Mexico to Tucson, Arizona, west to Organ Pipe Cactus National Monument and north to Pinal County, Arizona. In Tucson, found on hot, dry, south facing slopes of basalt and along desert washes. The largest population is found in creosote bush desertscrub on gravelly loams primarily derived from weathered granites.	Known to occur in the general area. This plant has been found on lands close to those owned by the City of Tucson, and is likely to occur on those City-owned lands with natural open space.
Pima Indian mallow (*Abutilon parishii*)	USFWS SOC USFS-S ADASR	This species is found in mesic situations in full sun in Sonoran Desertscrub at 1,720 to 4,900 ft. It occurs on rocky hillsides, cliff bases, canyon bottoms, lower side slopes and ledges of canyons among rocks and boulders. In riparian zones, it occurs on flat secondary terraces but typically not in canyon bottoms. Often found near trails, probably due to the influence of the trail on the light, heat, and water of the microhabitat .	Unlikely to occur. Although this species is known to occur in the general area, within Saguaro National Park, suitable habitat is not present on any of the City-owned lands.
Thornber's nipple cactus (*Mammillaria thornberi*)	ADA-SR	Found in Pinal, Pima and Maricopa counties south into Sonora, Mexico. Occurs in Sonoran Desertscrub on sandy flats and lower bajadas at 200 to 600 to 2500 ft.	Known to occur in the general area, and likely to occur on City-owned properties with relatively undisturbed vegetation.
ANIMALS			
Invertebrates			
Arkenstone Cave pseudoscorpion *(Albiorix anopthalmus)*	PVS	Known from only one cave (Arkenstone Cave) in Colossal Cave Park east of Tucson.	Extremely unlikely to occur. The Avra Valley is approximately 20 miles from the only known location.
Fish			
talus snails *(Sonorella* spp.) (15 taxa)	*S. eremita* was proposed for listing but is now covered by a Conservation Agreement Other species have no status. PVS	Apparently all 15 taxa occur on steep, talus slopes (generally or exclusively of limestone) in isolated, undisturbed areas in mountains or hills.	Extremely unlikely to occur. None of the City-owned parcels have talus slopes or exposed rock.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Fish			
desert pupfish (*Cyprinodon macularius*)	USFWS E USFS-S WSCA PVS	Species historically present in the Santa Cruz River, but is considered extirpated.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
Gila topminnow (*Poeciliopsis occidentalis occidentalis*)	USFWS E USFS-S WSCA PVS	In Arizona, most of the remaining populations occur in the upper Santa Cruz River system, Sonoita Creek, and Cienega Creek, and the middle Gila River.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
loach minnow (*Tiaroga cobitis*)	USFWS T USFS-S WSCA	Historically known from the San Pedro River, which is designated Critical Habitat. Currently known populations are found in the upper Gila, San Francisco, Blue, Tularosa, Black, and White Rivers, as well as Aravaipa, Eagle, Campbell Blue, and Dry Blue Creeks.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
spikedace (*Meda fulgida*)	USFWS T USFS-S WSCA	Historically known from the San Pedro River, which is designated Critical Habitat. In Arizona, populations are found in Aravaipa Creek, Eagle Creek, and a portion of the upper Verde River. Undiscovered populations may exist in unsampled Gila basin streams.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
Gila chub (*Gila intermedia*)	USFWS PE USFS-S WSCA PVS	The Gila chub is currently known from the following drainages in Arizona: Santa Cruz River (Cienega Creek, Sabino Canyon, Sheehy Spring), middle Gila River, San Pedro River, Agua Fria River, and Verde River. However, it is considered extirpated from the mainstream Santa Cruz River in Arizona.[3]	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
longfin dace *(Agosia chrysogaster*)	USFWS SOC PVS	Historically found throughout Arizona. Currently found in a broad area as disjunct populations. Generally in moving water over a sandy substrate.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.

[3] Weedman, D. A., A.L. Girmendonk, and K.L. Young. 1996. Status review of Gila chub, *Gila intermedia*, in the United States and Mexico. Nongame and Endangered Wildlife Program Technical Report 91. Arizona Game and Fish Department, Phoenix, Arizona.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Fish			
speckled dace (*Rhinichthys osculus*)	USFWS SOC USFS-S	In Arizona, found in Colorado, Bill Williams, and Gila River drainages, except slower and warmer portions of Colorado River mainstream. Found in rocky riffles, runs, and pools of headwaters, creeks, and small to medium rivers, usually in water less than 0.5 m (1.6 ft.) deep, often congregating below riffles and eddies. Breeding adults prefer swift water.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
desert sucker *(Catostomus =Pantosteus clarkii)*	USFWS SOC PVS	Historically this fish occurred in the San Pedro and Santa Cruz Rivers and their tributaries. It is known consistently only from some of the tributaries of the San Pedro. Native to the Gila and San Francisco drainages; widespread in the Gila and Bill Williams river basins.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
Sonora sucker *(Catostomus insignis)*	USFWS SOC PVS	Historically this fish occurred in the San Pedro and Santa Cruz Rivers and their tributaries. It is known consistently only from some of the tributaries of the San Pedro. Native to the Gila and San Francisco drainages; widespread in the Gila and Bill Williams river basins.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
Amphibians and Reptiles			
lowland leopard frog *(Rana yavapaiensis*)	USFWS SOC USFS-S WSCA PVS	Occurs in south-central, central, west-central, and extreme northwestern Arizona, south and west of the Mogollon Rim. Recently found in 5 canyons in the Rincon Mountain District of Saguaro National Park in Pima County. Known from 10-20 sites in eastern Pima County.	Extremely unlikely to occur. No natural permanent aquatic habitat is present on any of the City-owned parcels. There are bullfrogs present on the parcels that receive effluent water via the Santa Cruz River. The presence of bullfrogs probably precludes survival of native frogs.
Chiricahua leopard frog (*Rana chiricahuensis*)	USFWS T USFS-S WSCA PVS	This species typically occurs in a wide variety of natural and human-made aquatic habitats in deserts, grasslands, chaparral, and oak woodlands.	Extremely unlikely to occur. No natural permanent aquatic habitat is present on any of the City-owned parcels. There are bullfrogs present on the parcels that receive effluent water via the Santa Cruz River. The presence of bullfrogs probably precludes survival of native frogs.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Amphibians and Reptiles			
Great Plains narrow-mouthed toad *(Gastrophryne olivacea)*	WSCA	In Arizona, in the vicinity of Patagonia, Santa Cruz Co., and just south of San Xavier Mission and near Robles, Pima Co. to San Simon Wash between Quijotoa and Ajo; ranges north to 24 miles south of Casa Grande. Secretive, hiding in burrows or under bark, in rotten logs, under rocks, or in crevices near a water source during the day. Found in mesquite semi-desert grassland to oak woodland, in the vicinity of streams, springs and rain pools.	Known to occur in the Avra Valley, and possibly may occur on one or more of the City-owned parcels, especially those that have not been completely disturbed by historic agriculture.
Sonoyta mud turtle (*Kinosternon sonoriense longifemorale*)	USFWS C	The only known population of this species is from Quitobaquito Springs in Organ Pipe Cactus National Monument at 1,100 ft.	Extremely unlikely to occur. A different subspecies of this turtle occurs along the Santa Cruz River.[4] It may occasionally be found on Parcels 1, 2A, and 5.
desert tortoise (*Gopherus aggassizi*)	USFWS SOC WSCA	Widespread in the Sonoran Desert; from about 510 ft in Mojave desertscrub to semidesert grassland and interior chaparral at about 5,300 ft. Requires loose soil in which to excavate burrows below rocks and boulders, but may also use rock crevices. Tortoises occasionally burrow under vegetation, less often dig soil burrows on more or less open slopes, and also use caliche caves in incised wash banks. They will also rest directly under live or dead vegetation without constructing a burrow.	Likely to occur on some of the City-owned properties; however, none of the properties appear to have habitat that would be considered high quality for the Sonoran Desert population of Desert Tortoise. This population is generally associated with rocky slopes and hills, and there are none on the parcels.
Tucson shovel-nosed snake *(Chionactis occipitalis klauberi)*	PVS	Occurs from south of Tucson northward along Avra Valley to Pinal County and Maricopa County. Current distribution in Pima County poorly known; may have been eliminated from much of the Avra Valley. Found on lowland valley floors in areas with sand and loose soil.	Possibly may occur in undisturbed portions of the City-owned lands.
Organ Pipe shovel-nosed snake *(Chionactis palurostris organica*)	PVS	In Arizona, most if not all of the current range is in Organ Pipe Cactus National Monument. May occur on the Tohono O'odham Nation in western and central Pima County.	Extremely unlikely to occur. The Avra Valley is more than 60 miles from known occurrences.

[4] Arizona Game and Fish Department. 1997. *Kinosternon sonoriense*. Unpublished abstract compiled and edited by the Heritage Data Management System. Arizona Game and Fish Department, Phoenix, AZ. 2 pp; and K. J. Kingsley, personal observations.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Amphibians and Reptiles			
giant spotted whiptail *Cnemidophorus burti stictogrammus*)	USFWS SOC USFS-S PVS	In Pima County, this species has been recorded in the Santa Catalina, Santa Rita, and Baboquivari Mountains. Formerly common in Sabino Canyon. Extirpated from most of the Santa Cruz River valley. Inhabits mountain canyons, arroyos, and mesas, entering lowland desert along stream courses and riparian areas.	Possibly may occur, particularly along Brawley Wash.
red-backed whiptail *(Cnemidophorus burti xanthonotus*)	USFWS SOC PVS	The entire range of this subspecies includes the southwest-central border of Arizona in Pima County and northern Sonora. In Pima County, known primarily from the Ajo Mountains at Organ Pipe Cactus National Monument. Known habitat includes areas with rocky slopes and semidesert grassland.	Possibly may occur.
ground snake *(Sonora semiannulata)*	PVS	In Pima County, small numbers occur in many small populations on the Tohono O'odham Nation, its eastern border between Marana and Eloy, and rarely around Tucson. Inhabits plains, valleys, and foothill habitats; found mostly near mountains with higher slopes.	Possibly may occur.
Mexican garter snake *(Thamnophis eques megalops)*	USFWS SOC USFS-S WSCA PVS	In Pima County, currently known only from Cienega Creek; extirpated from the Santa Cruz and Rillito rivers, and Tanque Verde and Pantano washes in the Tucson area, and not known to have occurred along the San Pedro in this area[5]. Inhabits areas of permanent water with lush vegetation at elevations ranging from 1,739 to 6,152 ft.	Extremely unlikely to occur. No natural permanent aquatic habitat is present in the project area or on any of the City-owned parcels.
desert box turtle *(Terrapene ornata luteola*)	PVS	In Arizona, occurs in the southern portion of the state from the New Mexico border to the eastern base of the Baboquivari Mountains at elevations ranging from sea level to 6,600 ft. Has been observed in grasslands of the Empire-Cienega Resource Conservation Area and in the valley of the Santa Cruz River near Sahuarita. Primarily a prairie turtle that inhabits arid and semi-arid treeless plains and rolling grass and shrub lands where soils are sandy.	Possibly may occur.

[5] Rosen, P.C. and C.R. Schwalbe. 1988. Status of the Mexican and narrow-headed garter snakes (*Thamnophis eques megalops* and *Thamnophis rufipunctatus rufipunctatus*) in Arizona. Unpubl. Report from Arizona Game and Fish Department. (Phoenix, Arizona) to U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Birds			
bald eagle (*Haliaeetus leucocephalus*)	USFWS T USFS-S WSCA	A small Arizona resident population of about 40 pairs nests primarily along the Salt and Verde Rivers. Additional nest sites are along the Gila, Bill Williams, Agua Fria, and San Pedro River drainages (downstream from Pima County, at the Gila River confluence). Nest sites are high in trees, on cliffs, or on pinnacles in close proximity to water that has large fish.	Extremely unlikely to occur. There are no large bodies of water with large fish on the Avra Valley lands. However, wandering individuals may occasionally be temporarily attracted to the Clearwater project recharge basins.
brown pelican (*Pelecanus occidentalis*)	USFWS E	Generally a coastal resident, the brown pelican can occasionally be found on Arizona's lakes and larger rivers, or even in the City of Tucson following episodes of strong winds from a coastal area. It depends on large bodies of water with plentiful fish.	Extremely unlikely to occur. There are no large bodies of water with large fish on the Avra Valley lands. However, wandering individuals may occasionally be temporarily attracted to the Clearwater project recharge basins.
cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*)	USFWS E USFS-S WSCA PVS	Historically, the primary habitat of this owl in central and southern Arizona was apparently cottonwood-willow forests, mesquite bosques, and Sonoran Desertscrub vegetation communities. Currently, it is known in Arizona only from the following two vegetation communities: (1) Sonoran Desertscrub in braided-wash systems with paloverde, ironwood, and mesquite; and (2) Semidesert Grassland with drainages containing mesquite, hackberry, and ash. Geographically, the majority of current CFPO records are concentrated in northwest Tucson and the Altar Valley. Critical Habitat was proposed anew in 2002 and includes some City-owned lands in the Avra Valley.	Unlikely to occur, but see discussion following this table.
masked bobwhite (*Colinus virginianus ridgewayi*)	USFWS E USFS-S WSCA	The one known population in the state is a reintroduced population at Buenos Aires National Wildlife Refuge. It is known only from dense, tall desert grassland.	Extremely unlikely to occur. The southernmost City-owned parcel is approximately 18 miles from the Buenos Aires National Wildlife Refuge. There is no evidence that the re-introduced population is expanding. There is no dense, tall desert grassland vegetation on any City-owned parcel.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Birds			
Mexican spotted owl *(Strix occidentalis lucida)*	USFWS T USFS-S WSCA	Occurs in mature forest and woodland, shady wooded canyons and steep canyons.	Extremely unlikely to occur. The City-owned parcels are several thousand ft below the normal elevation range of this species, and vegetation conditions do not resemble those in which this species has been found.
southwestern willow flycatcher (*Empidonax traillii extimus*)	USFWS E WSCA PVS	Occurs in dense riparian habitats along streams, rivers, and other wetlands with cottonwood, willow, boxelder, buttonbush, and arrowweed.	Unlikely to occur. Most of the City-owned parcels do not have vegetation conditions or water that would be considered habitat for this species. Parcels 1, 2A, and 5 have some potential for developing suitable habitat, but do not appear to be suitable at this time.
yellow-billed cuckoo (*Coccyzus americanus*)	USFWS C USFS-S WSCA	In Arizona, yellow-billed cuckoos breed primarily in large blocks of cottonwood/willow riparian habitat along central and southern Arizona rivers.[6]	Likely to occur as a migrant on parcels 1, 2A, and 5. Cottonwood-willow vegetation along the Santa Cruz River on these parcels does not appear to be suitable for breeding.
tropical kingbird (*Tyrannus melancholicus*)	USFS-S WSCA	A rare bird that is generally found in riparian woodland below 4,000 ft.	Known to occur occasionally in the general area, downstream from Parcel 1[7]. Possibly may occur occasionally on Parcel 1.

[6] U.S. Fish and Wildlife Service. 2001. Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition to List the Yellow-billed Cuckoo (*Coccyzus americanus*) n the Western Continental United States. Federal Register 66: 38611-38626; and Corman, T.E. and R.T. Magill. 2000. Western yellow-billed cuckoo in Arizona: 1998 and 1999 survey report. Nongame and Endangered Wildlife Program Technical Report 150. Arizona Game and Fish Department, Phoenix, Arizona.

[7] Tucson Audubon Society. 1999. Davis and Russell's Finding Birds in Southeast Arizona. Tucson Az.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Birds			
burrowing owl *(Athene cunicularia*)	PVS	Considered rare in Pima County, it inhabits grasslands, open areas of desert-scrub, and disturbed areas. Recent reliable observations include the agricultural fields near Pinal Air Park, along the airstrip at Davis Monthan Air Force Base, and along the Santa Cruz River near 29th Street. Inhabits grasslands, pastures, desertscrub, edges of agricultural fields, golf courses, vacant lots, and road embankments.	Reported to occur on Parcel 1.[8] Possibly may occur around other inactive agricultural fields, but none were observed during field reconnaissance.
rufous-winged sparrow *(Aimophila carpalis)*	PVS	In Pima County, this species is fairly widespread in appropriate habitat. Specific locations include Saguaro National Park (east) and the Tucson area. Inhabits flat or gently hilly Sonoran Desertscrub vegetation with scattered trees and shrubs.	Likely to occur. Vegetation resembling that in which this species is often found is present on many of the parcels. However, none were detected during field reconnaissance.
Abert's towhee *(Pipilo aberti)*	PVS	In Pima County, this species is relatively common along brushy washes and the effluent-dominated riparian woodland portion of the Santa Cruz River; also present in urban backyards especially those that are along washes.	Known to occur. Individuals may be found in mesquite on many parcels, and in cottonwood-willow areas on Parcel 1.
Bell's vireo *(Vireo belli*)	PVS	In Pima County, this species is a common summer resident in dense shrubs and trees of lower canyons, generally below the oak zone, and along desert streams and washes in dense riparian vegetation.	Known to occur. Individuals may be found in mesquite on many parcels, and in cottonwood-willow areas on Parcel 1.
Swainson's hawk *(Buteo swainsoni*)	USFWS SOC USFS-S WSCA PVS	In Arizona, this species breeds throughout the state in suitable open grassland habitats and open desertscrub that includes a grassland component.	Likely to occur. Nesting Swainson's Hawks have been reported in the general area,[9] and conditions on most of the City-owned lands resemble known foraging areas of this species.
Mammals			
lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)	USFWS E USFS-S WSCA PVS	Day roosts are in caves, abandoned tunnels, and unoccupied buildings. Forages on nectar, pollen, and fruits of paniculate agaves and columnar cacti.	Possibly may occur, flying over some of the parcels, but extremely unlikely to occur regularly on any of the parcels. There are no suitable roost sites and no food plants present on the parcels.

[8] http://www.tucsonaudubon.org/conservation/scriver.htm

[9] Tucson Audubon Society. 1999. Davis and Russell's Finding Birds in Southeast Arizona. Tucson, Az. And Arizona Breeding Bird Atlas data.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Mammals			
Mexican gray wolf (*Canis lupus baileyi*)	USFWS E USFS-S WSCA	Extirpated from the U.S. Has been reintroduced to sites in the Apache and Gila National Forests. Inhabits oak and pine/juniper savannahs in the foothills and mixed conifer woodlands above 4,000 ft.	Extremely unlikely to occur. This species was reintroduced to an area over 150 miles from the Avra Valley lands.
Sonoran pronghorn (*Antilocapra americana sonoriensis*)	USFWS E WSCA	Small population in southwestern Arizona and adjacent Mexico.	Extremely unlikely to occur. Avra Valley is more than 100 miles from the nearest population and does not contain "extensive" desert grassland vegetation.
jaguar (*Panthera onca*)	USFWS E USFS-S	Found near water in the warm tropical climate of savannah and forest. Rarely found in extensive arid areas. Individuals in Arizona have been found in Sonoran desertscrub up through subalpine conifer forest.	Extremely unlikely to occur. Individuals are very rare and wander widely; the probability of one being present in the Avra Valley is extremely low, although it cannot be completely ruled out.
ocelot (*Felis pardalis*)	USFWS E USFS-S WSCA	Found in desert scrub communities with dense cover; there have been a handful of unconfirmed reports of individuals in the southern part of Arizona.	Extremely unlikely to occur. Although the Avra Valley contains desert scrub vegetation, cover is not "dense". Avra Valley is not within known current range.
Mexican long-tongued bat (*Choeronycteris mexicana*)	USFWS SOC USFS-S WSCA PVS	Known to occur at scattered locations in Pima County. In summer occupies mine tunnels, caves, and rock fissures primarily at elevations of 4,000 to 6,000 ft from the lower edge of the oak zone, through the pine-oak woodland, possibly to the pine-fir belt.	Possibly may occur, flying over some of the parcels, but extremely unlikely to occur regularly on any of the parcels. There are no suitable roost sites and no food plants present on the parcels.
Allen's big-eared bat *(Idionycteris phyllotis)*	USFWS SOC PVS	Not currently known from Pima County. In Arizona, most specimens have been collected from the southern Colorado Plateau, the Mogollon Rim, and adjacent mountain ranges. Inhabits ponderosa pine, pinyon-juniper, and riparian woodland vegetation types, as well as desertscrub.	Extremely unlikely to occur. This species is not known from the general area, and the area lacks any of the vegetation types in which this species has most frequently been found. There are no potentially suitable roost sites on any of the City-owned parcels.
western yellow bat *(Lasiurus xanthinus)*	USFS-S WSCA PVS	Most known records of yellow bats from Arizona are from urban Tucson and Phoenix where they are associated with planted fan palms. This bat roosts in palm trees and riparian deciduous trees.	Unlikely to occur on any of the parcels, except possibly on Parcel 1 where there are some riparian deciduous trees.

Table 1., continued. Likelihood of Occurrence of Special Interest Species on City-owned Properties in the Avra Valley

Species	Status*	Range/Habitat	Likelihood
Mammals			
western red bat *(Lasiurus blossevillii)*	USFS-S WSCA PVS	In Pima County, along riparian corridors with oaks, sycamores, and cottonwoods.	Unlikely to occur on any of the parcels, except possibly on Parcel 1 where there are some riparian deciduous trees.
California leaf-nosed bat *(Macrotis californicus)*	USFWS SOC USFS-S WSCA PVS	Populations are known from inactive mines in most of the mountain ranges in Pima County. Nearby roosts include Tucson Mountain Park and several mines in the Silverbell Mountains.	Possibly may occur foraging over some of the parcels, but extremely unlikely to occur regularly or to roost on any of the parcels. No inactive mines are present on any of the parcels.
pale Townsend's big-eared bat *(Plecotus townsendii*)	USFWS SOC PVS	In Pima County, this species is frequently found in inactive mines and caves, and occasionally in buildings. Occurs through a range of elevations and vegetation communities in Arizona including Sonoran Desertscrub, Madrean Evergreen Woodland, and coniferous forests.	Possibly may occur foraging over some of the parcels, but extremely unlikely to occur regularly or to roost on any of the parcels. No inactive mines are present on any of the parcels.
Merriam's mouse (*Peromyscus merriami*)	PVS	Known primarily from dense, forest-like stands of mesquite (bosques); also found in thick stands of mesquite, cholla, prickly pear, paloverde, and grasses. There apparently is only one record of this species from Pima County in the last 30 years (from Organ Pipe Cactus NM). Most historic locations have been altered and recent records are lacking. Unknown whether this species still occurs along the Santa Cruz River.	Extremely unlikely to occur. Well-developed mesquite bosque habitat does not occur in this portion of the Avra Valley, which is more than 100 miles from the nearest known recent location for this species.
Arizona shrew *(Sorex arizonae)*	USFWS SOC USFS-S WSCA PVS	Has not been found in Pima County; previous records from the Santa Rita Mts. are from outside of Pima County. All records are from high mountain ranges in southeastern Arizona and western New Mexico. In Arizona, they have been recorded in the Huachuca, Santa Rita, and Chiricahua Mountains.	Extremely unlikely to occur. The Avra Valley lands are several thousand ft below the elevation range of this species and vegetation communities and substrates in the Avra Valley lands are not similar to those known to support this species.

*Status Definitions
USFWS E=Endangered, USFWS T=Threatened, USFWS P=Proposed Threatened or Endangered, USFWS C=Candidate for listing, USFWS CA= Conservation Agreement; USFWS SOC= Species of Concern; USFS-S= U.S. Forest Service Sensitive, WSCA= Wildlife of Special Concern in Arizona, ADAHS= Arizona Department of Agriculture Highly Safeguarded, ADASR= Arizona Department of Agriculture Salvage Restricted, PVS= Priority Vulnerable Species in Pima County. Most information is based on Recon (2001) and information from the Arizona Heritage Database Management System.

3.0 DISCUSSION

This section presents a more detailed discussion of those special interest species with the greatest likelihood of occurring on City-owned lands in the Avra Valley or that may be subject to ESA compliance for habitat-related impacts in the Avra Valley. It includes species that:

- are known to occur, either on the basis of available records or personal observations;
- are considered likely to occur but are not known to occur;
- might possibly occur or be introduced to the Avra Valley lands; and/or,
- for which critical habitat, or other legislative land classification, has been proposed or is likely to be proposed on or near City-owned lands.

The discussion is divided into two sections: (1) federally listed species, and (2) other special interest species (not federally listed).

3.1 FEDERALLY LISTED, PROPOSED, AND CANDIDATE SPECIES

3.1.1 Huachuca Water Umbel

Huachuca water umbel is a semi-aquatic plant. It was historically found in the Santa Cruz River, but it has not been observed there for many years. It may be desirable for the City to consider establishing a population of this species in either the Santa Cruz River on parcels 1, 2A, and/or 5, or at created wetlands anywhere on City property. Parcels 1, 2A, and 5 are within a Priority Conservation Area, Tier 4 for this species (Figure 4). This means that these parcels are within the area identified as having the potential for restoration or enhancement.[10] However, it is highly unlikely that this would be considered as mitigation for take (as defined under the Endangered Species Act) because it is unlikely that the City would find itself in a situation where mitigation for this species would be necessary in this watershed. See the discussion on Mitigation Opportunities.

3.1.2 Pima pineapple cactus

Pima pineapple cactus is known to occur in the Avra Valley, primarily south of Highway 86, but there are a few records of it being found north of the highway.[11] As part of the EES range study for this species, several plots close to, but not actually on, City-owned property (Parcels 24, 25, and 26) were surveyed for this species. Plants were found to the east and west of Parcel 25, to the east of Parcel 24, and to the west of Parcel 26, but the City-owned parcels were not searched and no plants were found on the plots that were located closest to City-owned parcels. Also, no plants were found more than two miles north of the highway, despite the presence of more than 25 plots located more than two miles north of the highway.[12] SWCA, Inc. biologists conducted a brief search on portions of parcels 24, 25, and 26 as part of the field

[10] Sonoran Desert Conservation Plan. 2001. Priority Conservation Areas. Report prepared by Pima County.
[11] Ecosphere Environmental Services, Inc. Final Report. A range study of *Coryphantha scheeri* var. *robustispina*. Report prepared for U.S. Bureau of Reclamation.
[12] *Ibid.*

reconnaissance for this report, and saw no Pima Pineapple Cacti. It is possible that this species may be present on parcels 24, 25, and 26, but the undisturbed portions of these parcels do not closely resemble sites where Pima pineapple cacti have been found and it appears that these parcels may not be particularly good habitat for this species. Therefore, it is unlikely that these parcels would offer mitigation opportunities, such as mitigation banking, for this species. However, if any construction activities involving a federal permit or federal funding were to be undertaken on parcels 24, 25, and 26, a survey for this species would be advisable. The remaining Avra Valley parcels are outside the known geographic range of this species, and would not warrant surveys for this species prior to construction.

3.1.3 Gila Chub

Gila chub is considered extirpated from the Santa Cruz River, but is known to occur in some of its tributaries. The USFWS published a proposal to list the species as endangered, with critical habitat, on August 9, 2002.[13] No portion of the Santa Cruz River was included in proposed critical habitat for this fish. It is possible, though very unlikely, that the final critical habitat designation might include the Santa Cruz River, and any actions that could potentially deplete the surface flow of water might be considered adverse modification. Options under this scenario might include implementation of a Safe Harbor Agreement, introduction of Gila chubs to the Santa Cruz River on City-owned property, or some form of mitigation plan, including guaranteeing a specific amount and quality of water.

3.1.4 Cactus Ferruginous Pygmy-owl

The situation with regard to the listing of the cactus ferruginous pygmy-owl (CFPO) and the designation of critical habitat is dynamic. In August 2003, the Ninth Circuit Court of Appeals determined that the USFWS "did not articulate a rational basis... for its finding that the discrete Arizona pygmy-owl populations is significant..." and the listing was remanded to the District Court where it will be either upheld or rescinded. For now, however, the owl remains listed as an endangered species under the protection of the ESA. Critical habitat for the CFPO was proposed in November 2002, and the proposed critical habitat includes some City-owned lands. In the most recent Draft Recovery Plan (January 2003), several City-owned parcels are within the boundaries of a proposed CFPO recovery area. Of these, two parcels are currently developed or proposed as CAVSARP and SAVSARP project areas. Of particular concern is that these parcels appear to have been identified as a critically important connecting corridor for owls in the Recovery Plan. It is, therefore, possible that the final designated critical habitat boundaries will include these sites. If the listing of the species as endangered is upheld, and it the final designated critical habitat includes City-owned lands, then mitigation may be required in further development of some City projects in the Avra Valley.

At the current time (September 9, 2003), the CFPO is listed as an endangered species. Populations have been found upstream of Avra Valley along Altar Wash, and downstream in northwest Tucson, but none have been located in the immediate vicinity of the City-owned properties in the Avra Valley and vegetation conditions on the City-owned properties do not resemble those at sites where this species has

[13] U.S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants; Listing the Gila Chub as Endangered With Critical Habitat. Proposed Rule. Federal Register 67: 51948-51985.

Figure 4. The Avra Valley Lands with "Priority Conservation Areas" by species groupings from SDCP (Source: Pima County, 2002)

Figure 5. The Avra Valley Lands with Proposed "Conservation Land System" and Endangered Species Considerations (Source: Pima County, 2002).

been found. Specific surveys for this species were conducted over several years in association with development of the Clearwater Project, but no owls were found. The other City-owned Avra Valley lands have not to our knowledge been adequately surveyed for this species. Part or all of parcels 21, 23, 24 and 25 are designated as Recovery Areas in the Draft Recovery Plan and proposed as critical habitat (Figure 5). These designations may influence decisions regarding mitigation requirements for take or adverse modification of critical habitat. Mitigation was deemed necessary, for example, for impacts to critical habitat as part of the development of the Clearwater Project.

Several parcels are designated as Priority Conservation Area, Tier 23, in the SDCP. This Tier combines Tier 2, areas that would be of value to the reserve system, with Tier 3, critical landscape linkages. It is believed that Brawley Wash may provide a connection for owls moving between the Altar Valley and Northwest Tucson.

All of the Avra Valley parcels are within the area designated as Survey Zone 2 for this owl.[14] This zone includes the area within the currently known range of the owl (within Pima and southern Pinal counties) where there is a moderate potential for owls to occur. The USFWS recommends that all private landowners in this zone that are planning to remove any of the vegetation components of suitable habitat do one of the following:

1. Coordinate with USFWS to develop the property in a manner that avoids any negative effects to the pygmy-owl,
2. Survey the property to determine if an owl is present, or
3. Proceed as if pygmy-owls are present and develop a HCP so the activity can proceed.

These recommendations apply only to those areas that support suitable pygmy-owl habitat, which is defined as below 4,000 feet in elevation and with one or more of the following vegetation communities:

1. Riparian vegetation (such as cottonwoods, willows, mesquites, ash, or other trees growing along watercourses);
2. Sonoran desertscrub, particularly area containing saguaro cactus or other columnar cactus [8 feet or taller], with ironwood, mesquites, palo verde or other trees in association with at least some shrubs (acacia, prickly pear, desert hackberry, graythorn, etc.), and ground cover (triangle leaf bursage, burro week, grasses, etc.); or
3. Semi-desert grassland with drainages containing mesquite, hackberry, cottonwood, willow, ash, etc.

[14] U.S. Fish and Wildlife Service. 2000. Recommended guidance for private landowners concerning the cactus ferruginous pygmy-owl.

Any of these vegetation types without saguaros, but which contain the appropriate trees and lower-level cover, are considered suitable if there are individual trees with a trunk diameter of 6 inches or greater measured at 4.5 feet above the ground. Many of the City-owned parcels in the Avra Valley have some individual trees with a trunk diameter of 6 inches or greater. Parcels with larger trees would likely require compliance with the USFWS recommendations for surveys prior to the implementation of projects that might impact vegetation.

The entire situation with regard to this species may change at any time in the near future as a result of court decisions. Until such decisions become final, it is most appropriate for the City to proceed under the currently available status and information.

3.1.5 Southwestern Willow Flycatcher

Southwestern willow flycatcher inhabits dense riparian thickets. No suitable habitat for this species is present at this time on any of the parcels owned by the City of Tucson. However, the Santa Cruz River floodplain on Parcels 1, 2A, and 5 could be managed to create potentially suitable habitat for this species, though there is no assurance that habitat creation would be successful or that willow flycatchers would ever become established in the area, given their current limited abundance and distribution (they are not known to be established in the Santa Cruz River watershed at this time, though they apparently were historically known along the Santa Cruz River near Tucson[15]). Critical habitat was previously designated for this species, but was rescinded by court order. Previously designated critical habitat did not include the Santa Cruz River drainage or any land in Pima County. A new proposal for critical habitat was expected by the end of 2002, but was not released as of September 2003. The likely boundaries are not known at this time. It is possible, under the worst-case scenario, that the new critical habitat boundaries might include the Santa Cruz River, and that "adverse modification of critical habitat" would include any actions that reduce the effluent flow in the river. It is also possible that suitable habitat could develop within the current effluent-dominated Santa Cruz River and ultimately be occupied by willow flycatchers. If this should occur, then it is possible that any actions that reduce flow in the river could be construed as "take." It is possible that a Safe Harbor Agreement could be developed for the effluent-dominated portion of the river currently owned by City of Tucson. This would protect the City from liability for take if the City in the future reduces the effluent flow to the River.

The Draft Recovery Plan for this species provides a narrative outline of recovery actions and a list of entities "responsible" for each action. City of Tucson is listed as one of the responsible entities for the following Priority 1 actions: (1) provide (re-establish) instream flows; (2) expand river channels, flow zones, and connectivity; (3) restore ground water, base flows, and flooding; and (4) develop exotic species management plans. City of Tucson is also listed as one of the responsible entities for urban wastewater outfall and rural irrigation tail waters for habitat restoration, a Priority 2 action. City of Tucson was not informed of these "responsibilities" prior to the issuance of the Draft Recovery Plan.

[15] U.S. Fish and Wildlife Service. 2001. Draft recovery plan southwestern willow flycatcher (*Empidonax traillii extimus*). Southwestern Willow Flycatcher Recovery Team Technical Subgroup, Albuquerque, New Mexico.

3.1.6 Yellow-billed Cuckoo

Yellow-billed cuckoo is found only in riparian areas with large trees, generally cottonwoods or willows. It has been sighted in recent years, almost certainly as a migrant, in dense willow thickets along the effluent-dominated portion of the Santa Cruz River drainage near Tucson. There are no nest records near Tucson in many years, though it is present as a nesting species upstream at Tubac.[16] It is unlikely that Parcels 1 and 2A have trees and riparian patches of sufficient size to provide nesting habitat for this species; however, such habitat could develop if vegetation were allowed or encouraged to mature. Annual surveys, mapping of known locations (if any), and development of a management plan for suitable habitat may be desirable future actions. This species is not currently listed as threatened or endangered, but is a candidate for listing and has been classified as "Warranted but Precluded by other Listing Priorities" with a priority of 6.[17] There are over 200 candidate species with higher priorities for listing. Since October 30, 2001, the USFWS has completed final listing rules for six species and proposed listing actions for ten species. This suggests that the yellow-billed cuckoo is not likely to be listed as threatened or endangered in the next five to ten years, unless there is a lawsuit demanding earlier listing[18]. Under the worst-case scenario, it is possible that the cuckoo could be listed as endangered, that it could have critical habitat designated to include the Santa Cruz River, and that "take" and/or "adverse modification of critical habitat" could include any actions that reduce the effluent flow in the river.

3.2 OTHER SPECIAL INTEREST SPECIES (NOT FEDERALLY LISTED)

3.2.1 Tumamoc Globeberry

Tumamoc globeberry is a perennial plant that lives as a large tuberous root with no visible growth above ground for most of the year. It grows rapidly during the summer rainy season, sending vines up and through supporting plants, such as mesquite trees. It was formerly listed as an endangered species by the USFWS, but was removed from the list when it was discovered to be more abundant and widespread than was thought at the time of listing. It is considered a PVS under the SDCP, but Priority Conservation Areas were not mapped for this species. It may be reconsidered for listing by the USFWS because populations in Mexico appear to be threatened by encroachment of non-native buffelgrass (*Pennisetum ciliare*). It is known from the Avra Valley but is not known specifically from City-owned lands. Surveys for this species follow a protocol that requires they be done during a brief period of time (August and

[16] Corman, T.E. and R.T. Magill. 2000. Western yellow-billed cuckoo in Arizona: 1998 and 1999 survey report. Nongame and Endangered Wildlife Program Technical Report 1250. Arizona Game and Fish Department, Phoenix, Arizona.

[17] U.S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants; Review of Species That Are Candidates or Proposed for Listing as Endangered or Threatened; Annual Notice of Findings on Recycled Petitions; Annual Description of Progress on Listing Actions. Federal Register 67:40657-40679.

[18] According to a press release from the Center for Biological Diversity: "Species on the warranted-but-precluded list receive no legal protection. Nor is there any limit on how long a species may be left on the list. Of the 24 species currently on the warranted-but-precluded list, the average length of time since they were petitioned for listing is 10 years, including a 19 year delay for the sheath-tailed bat, a 15 year delay for six New Mexico springsnails, and 12 year delays for the Columbia and Oregon spotted frogs."

September). The field reconnaissance for this report did not occur during this time period. Therefore, it is not possible to state with certainty that this species occurs on any of the City-owned parcels. When this species was listed as endangered, the Central Arizona Project was undergoing planning and construction. Many individual plants were found along the CAP right-of-way, and moved to mitigation areas close to parcels 19, 20, and 21. It is possible that there may be some mitigation opportunities, including creating a mitigation bank, for this species on these or other parcels in the Avra Valley.

3.2.2 Thornber's Nipple Cactus

This cactus is known to occur in the Avra Valley. It is small, often found growing under or close to shrubs. It is not easy to distinguish from other similar, closely related, common cacti. There are no known threats to this species, and it is not listed as a special interest species by any agency except the Arizona Department of Agriculture, which lists it as a Salvage Restricted species. The Heritage Data Management System tracks it because it is Salvage Restricted. It was not identified during field reconnaissance for this report, but it was not the object of species-specific searches. If construction activities are planned for City-owned lands that are relatively undisturbed, compliance with the specific terms of the State and local plant preservation ordinances is desirable, and would result in some measure of protection for this species.

3.2.3 Lowland Leopard Frog

Lowland leopard frog is not currently known to occur in the Avra Valley or the Santa Cruz River. The published Priority Conservation Areas report of the SDCP did not identify any land in the Avra Valley as important for this species. However, the online version of Priority Conservation Areas includes a significant part of the Avra Valley along Brawley Wash, as well as the Santa Cruz River as important for this species (Figure 4). It is designated as a Tier 24 category, which is not defined in the report. It is possible that this designation is an error, or that it means the area should be considered as either Tier 2 (Sites that would be of value to the reserve system) or Tier 4 (Areas with potential for restoration or enhancement). Under current conditions, there is no suitable habitat for this species on any City-owned parcel in the Avra Valley. It is possible that habitat suitable for this species could be created on those parcels that have water available.

3.2.4 Desert Tortoise

Desert tortoise is likely to occur on some of the Avra Valley lands, especially parcels 15, 22, 23, 24, and 25. These parcels include some relatively undisturbed land close to rocky hills, which is more typical habitat for this species than is valley land. The Sonoran Desert population of this species is subject to few threats, although construction activities, livestock grazing, off-road vehicle activity, and illegal collecting may directly affect individuals and local populations. The Arizona Game and Fish Department has prepared a management plan for this species, with specific suggestions and guidelines for dealing with

tortoises encountered during construction activities.[19] Surveys for this species and mitigation for take are not required by any agency.

3.2.5 Tucson Shovel-nosed Snake

This snake possibly may occur on undisturbed portions of some of the Avra Valley lands. Even small areas may be appropriate habitat for this species if there is some undisturbed native vegetation and sandy soil. The SDCP identifies several parcels as being within Priority Conservation Areas for this species (Figure 4). These include parcels 8, 9, 10, 11, 12, 18, 19A, 19B, 20, 21, which are included in Tier 2 (areas that would be of value to the reserve system). Parcels 1, 2A, 2B, 3, 4, 5, 6, 7 are included in Tier 14, which is not defined in the SDCP report, but is presumed to mean areas with populations that must be within the reserve system interspersed with areas with the potential for restoration or enhancement. Surveys for this species and mitigation for take are not required by any agency.

3.2.6 Ground Snake

Ground snake possibly may occur on parcels that have some undisturbed native soil and vegetation. The SDCP identifies parcels 1, 2A, 2B, 3, 4, and 5 as being in Priority Conservation Areas, Tier 14 (presumed to mean areas with populations that must be within the reserve system interspersed with areas with the potential for restoration or enhancement) (Figure 4).

3.2.7 Red-backed Whiptail

This lizard is recorded primarily from rocky slopes with mountain scrub vegetation and desert grasslands with junipers and other scrubby trees.[20] However, an area that includes Parcel 15 has been designated as Priority Conservation Area, Tier 2 for this species (Figure 4). Though it is possible that this species might occur on Parcel 15, its presence is considered unlikely because the parcel is flat and lacks the habitat characteristics typical of areas known to support this lizard. The parcel is separated from potentially suitable habitat by a low-density residential area with roads and introduced predators such as cats and dogs, and cleared areas for houses and horse corrals.

3.2.8 Giant Spotted Whiptail

Giant spotted whiptail is a large lizard that possibly may occur along Brawley Wash. Surveys for this species have not been conducted, and the species is not easily observed without careful searching. It has recently been found along the West Branch of the Santa Cruz River, in a narrow strip of dense mesquite bordered by inactive agricultural fields. The distribution of this species is not well known, so it may occur on some of the City-owned properties with dense mesquite, such as parcels 2B, 4, 9, 12, 18, 21, 24, and 25. It is possible also on parcels 1, 2A, and 5 along the Santa Cruz River. This species is threatened

[19] Arizona Interagency Desert Tortoise Team. 1996. Murray, R.C., and V. Dickinson (eds.). Management plan for the Sonoran Desert population of the desert tortoise in Arizona. Arizona Interagency Desert Tortoise Team. 55pp.

[20] Sonoran Desert Conservation Plan. 2001. Priority Vulnerable Species.

by loss of dense riparian (including xeroriparian) vegetation. Management measures that can protect such vegetation may benefit the lizard. Surveys for this species, and mapping any populations on City-owned land may be considered desirable actions, as well as management actions that will help ensure protection of riparian areas.

3.2.9 Desert Box Turtle

This terrestrial turtle is usually found in grasslands or riparian areas. Pima County is the western-most locality of the species, and populations here are scattered and not well known. Vegetation that appears somewhat similar to that in which this species has been found is present on some of the Avra Valley lands, particularly parcels 24 and 25. Surveys for this species on these parcels may be considered appropriate actions. No specific management actions are considered necessary or appropriate, other than protection of the land from severe grazing. It is possible that controlled burns may benefit this species.

3.2.10 Tropical Kingbird

Tropical kingbird has been reported to be present occasionally in the general area of the Avra Valley lands along the Santa Cruz River. Actions that protect and/or encourage the growth of large riparian trees would benefit these birds.

3.2.11 Burrowing Owl

This small owl lives in burrows and feeds on rodents, birds, and arthropods. It is most often associated with fallow agricultural fields. It is recorded as breeding at several locations in the Avra Valley.[21] It has been reported to occur on Parcel 1, and is likely to occur on other parcels, but was not observed during field reconnaissance. It prefers open, usually disturbed areas that are largely devoid of vegetation. No specific management recommendations are appropriate, except to document and protect nests from direct disturbance if any are present. There has been some success with creating artificial nest burrows in some localities in which burrows are a limiting factor, and this approach may be desirable on some City-owned lands. Most of the Avra Valley lands are within the area designated as Priority Conservation Area, Tier 1 (areas with populations that must be within the reserve system) for this species (Figure 4).

3.2.12 Rufous-winged Sparrow

Rufous-winged sparrow is a small bird that inhabits a variety of habitats, generally characterized by spiny shrubs or trees and dense native grasses. Much of the Avra Valley appears to be suitable habitat for this bird, and it has been reported nesting in the area.[22] Parcels 23, 24, and 25 are at least partly within the Priority Conservation Area, Tier 1 for this species (Figure 4). Heavy livestock grazing is thought to have temporarily extirpated this species from Arizona, but the sparrow has returned and its populations have increased in recent years. No specific management actions are considered necessary or appropriate, other

[21] Arizona Breeding Bird Atlas records.
[22] *Ibid.*

than protection of the land from severe grazing. It is possible that controlled burns may benefit this species, if done outside the nesting period, which is the summer rainy season.

3.2.13 Abert's Towhee and Bell's Vireo

These small birds are typically found in dense riparian vegetation. They are known to occur along the Santa Cruz River and along washes and in dense mesquite patches on some of the Avra Valley lands. The Priority Conservation Areas for Abert's towhee include portions of parcels 1, 2A, and 5 (Figure 4). Protection of habitat from direct disturbance is the only appropriate management action that is likely to benefit either of these species.

3.2.14 Swainson's Hawk

Swainson's hawk is a large hawk that occurs in areas of open grassland and desertscrub habitat similar to that occurring in the Avra Valley.[23] Parcels 23, 24, and 25 are at least partly within the Priority Conservation Area, Tier 1 for this species (Figure 4). No specific management actions are appropriate, although this species may benefit from controlled burns and grazing management.

3.2.15 Bats

Several bat species may occur on the Avra Valley lands, but no records are available and apparently no systematic surveys for bats have been conducted in the Avra Valley. There are no caves, mines, or other potentially suitable roost sites for bats that use such sites on any of the City-owned parcels. There is little or no food in the form of saguaros or agaves for nectar and pollen feeding bats, such as lesser long-nosed bat and Mexican long-tongued bat on any of the parcels. However, part of Parcel 25 is within the area designated as a Priority Conservation Area, Tier 2 for lesser long-nosed bat. Also, part of parcels 21 and 23 are PCA Tier 2 for pale Townsend's big-eared bat (Figure 4). Neither species is likely to occur on any of these parcels because resources necessary for these species are not present. Western yellow bat and western red bat may occur along the Santa Cruz River in areas with large riparian trees (Parcel 1). Protection of the trees is the only appropriate management action.

4.0 THE SDCP AND THE AVRA VALLEY LANDS

The Avra Valley lands are included within the geographic area encompassed by the draft SDCP. Figure 5 shows the designated SDCP conservation categories of the lands within the Avra Valley. Portions of parcels 2A, 10, 11, 21, 23, and 24 are classified as Biological Core because they contain either recorded instances of several Potentially Vulnerable Species (PVS), habitat characteristics that indicate high probability of occurrence of several PVS, special elements of conservation concern (Figure 6), or have been delineated as Priority Conservation Areas for one or more PVS (Figure 4). Important Riparian Areas are also indicated as occurring on parcels 1, 2A, 4, 5, 8, 9, 11, 12, 16, 17, 18, 21, 23, 24, 25, and 26. Most of these are part of the Brawley Wash corridor, within the designated floodplain, and have dense mesquites. The SDCP puts a high value on conservation of these areas. Some of the Avra Valley lands

[23] *Ibid.*

are categorized as Multiple Use, and some as Recovery Area, because of their former designation as critical habitat for cactus ferruginous pygmy-owl or current designation in the Draft Recovery Plan (January 2003 version) as a Recovery Area or Special Management Area for cactus ferruginous pygmy-owl. Changes in the most recent version of the Draft Recovery Plan may eventually result in changes in designation of lands, with removal of some parcels and addition of others to the Recovery Area category. Because of their apparent high conservation value, some of the Avra Valley lands may provide opportunities for collaboration and negotiation with Pima County.

In September, 2002, Pima County Supervisors approved the purchase of property adjacent to City-owned Parcel 25 for conservation purposes. Advocates of the purchase touted the conservation value of this parcel to several species of PVS. This was largely inaccurate, in our opinion, as the parcel does not appear to be of conservation value for most of the species the County alleged would benefit. However, County acquisition of this property may present opportunities and constraints for City management of its adjacent parcel. Depending on City goals for the management of Parcel 25, and possibly other parcels in the Avra Valley, the City may wish to consider sale (or donation?) of Parcel 25 and other Parcels (e.g., Parcel 24, part of Parcel 23) to the County for conservation lands, while the City retains water rights and any active wells. This might ensure that the City's interests are maintained by the City, result in income from these properties, and demonstrate City cooperation with the County's SDCP. If necessary, the same case that the County made for conservation importance of their new purchase could be made for these City parcels, although the City might wish to make somewhat more accurate statements than those made by advocates of the County purchase.

Priority Conservation Areas (PCAs) were delineated by a team of experts on each Priority Vulnerable Species listed in the SDCP. [24] PCAs for these species were identified based on the following six tiers:

1. Areas that contain populations that must be included in the reserve system;
2. Areas that would be of value to the reserve system;
3. Areas that represent critical landscape linkages;
4. Areas that have the potential for restoration or enhancement;
5. Areas that need not be in the reserve; and
6. Areas that should not be in the reserve based on fragmentation, isolation, or degradation.

Species for which PCAs encompass City-owned properties in the Avra Valley are listed in Table 2. They are distinguished as either federally listed or other (not federally listed). Figure 4 shows the Avra Valley lands that are included within Priority Conservation Areas.

[24] Priority Conservation Areas. Report issued as part of the Sonoran Desert Conservation Plan. May 2001.

Figure 6. The Avra Valley Lands with “Special Elements” from SDCP (Source: Pima County, 2002)

Table 2. Species with Priority Conservation Areas in the Avra Valley

Federally Listed Species	**Tier**	**Parcels**
Huachuca water umbel	4	1, 2A, 5
cactus ferruginous pygmy-owl	23	2B, 3, 4, 6, 8, 9, 10, 11, 12, 18, 19A, 19B, 20, 21, 23, 24, 25
lesser long-nosed bat	2	25
Other Species (Not Federally Listed)		
lowland leopard frog	24	1, 2A, 2B, 3, 4, 5, 6, 8, 9, 10, 11, 12, 18, 19A, 19B, 20, 21, 23, 24, 25
ground snake	14	1, 2A, 2B, 3, 4, 5
redbacked whiptail	2	15
Tucson shovelnosed snake	14	1, 2A, 2B, 3, 4, 5, 6, 7
	2	8,9,10,11,12,18,19A, 19B, 20, 21
Abert's towhee	1	1, 2A, 5
rufous-winged sparrow	1	23, 24, 25
Swainson's hawk	1	23, 24, 25
western burrowing owl	1	All but 24 and 25
pale Townsend's big-eared bat	2	2, 23

5.0 EXPOSURE UNDER THE ESA AND MITIGATION OPPORTUNITIES

The potential for exposure to "take" or "adverse modification of critical habitat" under the ESA, and the possibilities for use of the Avra Valley lands as mitigation for City actions that may affect federally listed species are important considerations of this report. The USFWS has no precedent for accepting actions that may benefit one species as mitigation for actions that may harm another species, and the USFWS has not published a mitigation policy for off-site mitigation for Threatened and Endangered (T&E) species. However, in practice, the USFWS has allowed or directed off-site mitigation for take of some T&E species and adverse modification of critical habitat. As a general rule, off-site mitigation has been permitted, at the discretion of the USFWS, but has been limited to areas that are within the same watershed as the action area or otherwise clearly connected to the action area (such as Recovery Area or Critical Habitat Area for a T&E species).

The majority of City-owned properties in Tucson and the Avra Valley are within the Santa Cruz River watershed. In the Avra Valley, City-owned properties are within the Brawley Wash watershed, which is a tributary of the Santa Cruz River. Consequently, most (if not all) future City actions, in both Tucson and the Avra Valley, will continue to occur within the Santa Cruz River watershed. It is therefore possible that conservation actions on City-owned lands in the Avra Valley might be construed as appropriate mitigation for City actions elsewhere within the Santa Cruz River watershed. Parcels most likely to be desirable for conservation actions would be those crossed by the Santa Cruz River (parcels 1, 2A, and 5), and those crossed by Brawley Wash that have substantial stands of mesquites (parcels 4, 9, 11, 12, 18, 21, 23, 24, and 25). These parcels provide an opportunity to protect an almost continuous wash system with a corridor of xeroriparian vegetation connecting the Altar Valley and Buenos Aires National Wildlife Refuge to the Santa Cruz River, although under current Federal, County, and City policies, ordinances, and laws, the majority of the wash system is already fairly well protected from development-related encroachment.

Under the former critical habitat designation for the cactus ferruginous pygmy-owl, the City was directed by the USFWS to perform specific conservation actions as mitigation for the development of the Clearwater Project. In the absence of critical habitat, such mitigation would not have been required. It is highly unlikely that owls are actually nesting or otherwise using any City-owned land in the Avra Valley, and therefore unlikely that actual "take" would occur as a result of any City actions. In the absence of critical habitat, following the "Project Clearance Protocol" (i.e. survey protocol) provided by the USFWS for this species would likely be sufficient to protect the City from ESA exposure. The new proposed critical habitat designation for this species will almost certainly have implications for the management of the City-owned properties in the Avra Valley, if it becomes final. The Recovery Plan for this species, though not final, has been used to direct mitigation and management of lands within Special Management Areas and Recovery Areas. The legality of this is debatable, but, until that is resolved, the Recovery Plan should be considered in making decisions that involve any projects on parcels that are within these designated areas, specifically parcels 21, 23, 24, and 25. When and if the Recovery Plan becomes final, it will not have the force of law, but may influence Federal policy. If the listing of the owl is overturned

based on the recent Ninth Circuit Court of Appeals decision, then critical habitat and the Recovery Plan will no longer be considerations.

With regard to the Pima pineapple cactus, the City appears to have limited ESA exposure and mitigation opportunities in the Avra Valley. The potential for creating a mitigation bank, for example, appears unlikely. City-owned lands are on the edge of the currently known range of this species, and do not appear to support substantial populations of this species. It is possible that some cacti are present, and surveys before construction probably should probably be conducted on parcels 24, 25, and 26.

The City purchased the Avra Valley properties for their water rights, and water is almost certainly the most valuable commodity these lands have to offer for mitigation. Depending on specific circumstances and conditions, it is possible that the City might be able to use water as leverage in negotiating conservation actions with County and Federal agencies. Possibilities include creating and maintaining wetland and riparian habitats for water-dependent (e.g., native fish and frogs) and riparian-dependent species (e.g., southwestern willow flycatcher and yellow-billed cuckoo). The most likely sites for conservation actions utilizing water would be those properties along the Santa Cruz River (parcels 1, 2A, 5). However, other properties, particularly those encompassing major reaches of Brawley Wash, also have mitigation potential, but the exportation of water to create wetlands where none have existed previously should be carefully planned, negotiated, and tied to specific assurances and commitments from partner agencies before the City commits water or funds to such activities.